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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/877,249	06/11/2001	Stanley John Becker	608-297	7974
23117	7590	03/02/2004	EXAMINER	
NIXON & VANDERHYE, PC 1100 N GLEBE ROAD 8TH FLOOR ARLINGTON, VA 22201-4714			LEUNG, JENNIFER A	
			ART UNIT	PAPER NUMBER
			1764	

DATE MAILED: 03/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/877,249	BECKER ET AL. 
	<b>Examiner</b>	<b>Art Unit</b>
	Jennifer A. Leung	1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### **Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on 26 November 2003.

2a)  This action is **FINAL**.                            2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

4)  Claim(s) 1-7, 10-16, 18-20, 47-60 and 62-64 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5)  Claim(s) \_\_\_\_\_ is/are allowed.

6)  Claim(s) 1-7, 10-16, 18-20, 47-60 and 62-64 is/are rejected.

7)  Claim(s) \_\_\_\_\_ is/are objected to.

8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)  Notice of References Cited (PTO-892)  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12-18-03.

4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date.       .

5)  Notice of Informal Patent Application (PTO-152)  
6)  Other:       .

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment submitted on November 26, 2003 has been received and carefully considered. The IDS submitted December 18, 2003 has been considered. Claims 8, 9, 17, 21-46, 61 and 65 are canceled. Claims 1-7, 10-16, 18-20, 47-60 and 62-64 remain active.

### ***Claim Objections***

2. Claim 19 is objected to because the claim improperly depends on cancelled claim 17. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 3, 4, 49 and 50 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The language of the claims is directed towards a method limitation which renders the claims vague and indefinite, as it is unclear as to the structural limitations applicants are attempting to recite by, "said inert fluid comprises" and "said inert gas is selected from," since "inert fluid" and "inert gas" are not considered elements of the apparatus.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-6, 10, 11, 47-52, 54 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kittleson et al. (U.S. Re 24,485) in view of Chowdhury et al. (U.S. 4,461,743).

Regarding claims 1 and 47, Kittleson (FIG. 1; column 6, lines 57-68) disclose a reactor **10** comprising a grid **3** and more than one inlet pipe **11** for injecting a molecular oxygen containing gas. However, Kittleson are silent as to whether the more than one inlet pipe **11** may comprise the recited “means for surrounding a substantial portion of the pipe”. Chowdhury (FIG. 4) teach an injector for injecting a mixture of pure oxygen or oxygen enriched air into a reactor (defined by wall **26**), wherein the injector comprises an inlet pipe **20** adapted to extend into the reactor, wherein inlet pipe **20** comprises a means (annular space **22**, defined by pipe **20** and a second pipe **21**) for surrounding a substantial portion of the pipe **20** with an inert fluid, wherein the inert fluid surrounding pipe **20** is sealed (column 3, lines 22-31; column 4, lines 15-40). It would have been obvious for one having ordinary skill in the art at the time the invention was made to provide the surround means of Chowdhury to the more than one inlet pipe in the apparatus of Kittleson because the surround means creates a thermal insulating barrier for the oxygen within the inlet pipes, thereby alleviating the phenomenon of “flow reversal” caused by the high evaporation rates of oxygen, to maintain a continuous, positive flow of oxygen into the reactor, as taught by Chowdhury (column 6, lines 6-14; column 1, lines 12-27). Also, the recitation of “wherein the inert fluid surrounding the inlet pipe is provided with a limited supply

of inert fluid sufficient to replace minor leaks" (claim 47) provides no further structural limitations, and therefore the modified apparatus of Kittleson meets the claim.

Regarding claims 2 and 48, Chowdhury further teach said surround means **21, 22** surrounds at least 85% of the inlet pipe **20** (see FIG. 4).

Regarding claims 3-4 and 49-50, no further structural limitations are recited since the specific inert fluid used is not considered an element of the apparatus, and therefore the modified apparatus of Kittleson meets the claims. In any event, Chowdhury teach the inert fluid for the surround means may comprise nitrogen, carbon dioxide, and air (column 4, lines 25-31).

Regarding claims 5 and 51, Chowdhury further teach said means for surrounding comprises one or more outer pipes (i.e., second pipe **21**; FIG. 4) surrounding a substantial portion of said inlet pipes and provided with a supply of inert fluid (column 4, lines 20-25).

Regarding claims 6 and 52, the specification (page 4, lines 5-7) recites, "... differential expansion means may include *bends* in the inlet pipe and/or pigtails." Kittleson disclose bends in inlet pipes **11** (FIG. 1). Also, Chowdhury (FIG. 4) teach a bend in the pipes **20, 21, 22**.

Regarding claims 10, 11, 54 and 55, the collective teachings of Kittleson and Chowdhury further disclose means for suppressing ingress or "backflow" to the inlet pipe from the reactor, wherein said ingress suppression means comprises means for providing gas in said inlet pipe at a higher pressure than the pressure of the reactor (i.e., means for maintaining a "continuous positive flow" in the oxygen line; Chowdhury, column 6, lines 6-14, column 1, lines 12-27).

5. Claims 7 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kittleson et al. (U.S. Re 24,485) in view of Chowdhury et al. (U.S. 4,461,743), as applied to claims 1 and 47 above, and further in view of Takeuchi et al. (JP 55-36673).

The collective teachings of Kittleson et al. and Chowdhury et al. are silent as to whether the inlet pipes may further comprise a means for detecting a change in pressure of the inert fluid surround the inlet pipes. Takeuchi et al. (Abstract; Figure) teach a double-tube pipeline comprising an inner tube **1** and an outer tube **2**, wherein the pipeline comprises means for detecting a change in pressure of the fluid **b** located in the annular region between pipes **1** and **2** (i.e., in the case of a detected leakage) and thereby increasing the pressure of the fluid **b** such that it diffuses into the fluid **a** being conveyed by inner pipe **1**. It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide such means to the modified apparatus of Kittleson et al. because the pressure change detecting means would enable the detection of a leak within the inlet pipes and enable the signal for the diffusion of the conveyed fluid upon detection of the leakage, as taught by Takeuchi et al.

6. Claims 12-16 and 56-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kittleson et al. (U.S. Re 24,485) in view of Chowdhury et al. (U.S. 4,461,743), as applied to claims 1, 10, 47 and 54 above, and further in view of Walters et al. (U.S. 4,582,120).

Regarding claims 12, 13, 56 and 57, the collective teachings of Kittleson and Chowdhury are silent as to whether the inlet pipes may comprise a restriction, wherein the restriction comprises an orifice. Walters teach a plurality of inlet pipes (lances **20, 21**; FIG. 1), wherein each inlet pipe is provided with a restriction in the form of an orifice (see FIG. 2). It would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide such a restriction to the inlet pipes in the modified apparatus of Kittleson, on the basis of suitability for the intended use, because the restriction/orifice enables the control of the pressure drop within the pipes, as taught by Walters (column 10, lines 15-30, 39-48).

Regarding claims 14-16 and 58-60, although the collective teachings of Kittleson, Chowdhury and Walters are silent as to the restriction being located at the specifically recited locations, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate location for the restriction in the modified apparatus of Kittleson, on the basis of suitability for the intended use, since shifting location of parts was held to have been obvious. *In re Japikse*, 181 F.2d 1019, 1023, 86 USPQ 70, 73 (CCPA 1950), and where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

7. Claims 18 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kittleson et al. (U.S. Re 24,485) in view of Chowdhury et al. (U.S. 4,461,743), as applied to claims 1 and 47 above, and further in view of Wagner et al. (U.S. 5,801,265).

The collective teachings of Kittleson and Chowdhury are silent as to the distance between inlet pipes being significantly in excess of the potential flame length. Wagner disclose a reactor 36 comprising oxygen gas inlets 60, wherein the inlets 60', 60" are positioned such that the distance **D** between inlets 60', 60" is significantly in excess of a potential flame length (FIG. 3; column 4, lines 15-38). It would have been obvious for one of ordinary skill in the art at the time the invention was made to configure the inlet pipes at a distance significantly in excess of the potential flame length in the modified apparatus of Kittleson because such arrangement provides an improved system for introducing oxygen containing gas that avoids explosions, deflagration, or other anomalous process conditions, as taught by Wagner (column 2, lines 13-18).

8. Claims 19, 20, 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kittleson et al. (U.S. Re 24,485) in view of Chowdhury et al. (U.S. 4,461,743), as applied to

claims 1 and 47 above, and further in view of Marshall, Jr. (U.S. 2,654,658).

Regarding claims 19 and 63, the collective teachings of Kittleson and Chowdhury are silent as to a manifold means, or specifically a “common end box” for supplying the oxygen containing gas to the inlet pipes. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide such to the modified apparatus of Kittleson, on the basis of suitability for the intended use, since the provision of manifolds for supplying reagents to a reaction zone is conventionally known in the art, as evidenced by Marshall, Jr. To illustrate, Marshall, Jr. teaches a reactor **10** (FIG. 2) comprising a plurality of inlet pipes **30** for injecting a reagent into the fluidized bed, wherein the inlet pipes **30** are each connected to pipe **31**, wherein pipe **31** defines a manifold or “common end box” to feed reagent from a common supply source (not shown).

Regarding claims 20 and 64, the collective teachings of Kittleson and Chowdhury are silent as to the inlet pipes comprising flow restriction means. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide such means to the modified apparatus of Kittleson, on the basis of suitability for the intended use, since the provision of flow restriction means to control the feed rate of reagents to a reaction zone is well known in the art, as evidenced by Marshall, Jr., who teach a reactor (FIG. 2) comprising a plurality of inlet pipes **30** for injecting a reagent into a fluidized bed, wherein pipes **30** are provided with respective flow restriction means (shown as individual control valves).

#### ***Response to Arguments***

9. Regarding the rejection of claims 1-5 and 47-51 under 35 U.S.C. 102(b) as being anticipated by Iemori (JP 09-159145), Applicants' arguments have been fully considered and are

persuasive. Applicants argue (page 11, section IV),

“The furnace of Iemori has only one inlet pipe. In addition, Iemori does not disclose that the vessel has a grid.”

“Element 16 of Iemori is a concentrate burner, and does not have means for surrounding a substantial portion of said burner with an inert fluid.”

“The dashed lines do not represent a grid, but actually represent the layers of molten material and of the slag that rests on top of said molten material in the furnace.”

Although the Examiner agrees with applicant that the dashed lines do not represent a grid, the Examiner respectfully disagrees with Applicants' assertion that more than one inlet pipe is not shown. In the Abstract of Iemori, it is disclosed that, “The pipe for bubbling is installed in the hole provided at the *ceiling* of the furnace, the end of the pipe 1 is dipped in a melted material while blowing nitrogen as bubbling gas, and bubbling is conducted.” When we look to FIG. 3, it is clearly shown that the only ceiling openings are the openings provided for by elements 16. In any event, because Iemori does not disclose the grid element, the reference does not anticipate each and every element of the claimed invention, and thus the rejection is withdrawn.

10. Regarding the rejection of claims 1-6, 10, 11, 47-52, 54 and 55 under 35 U.S.C. 103(a) as being unpatentable over Kittleson et al. (US Re 24,485) in view of Chowdhury et al. (US 4,461,743), Applicants' arguments have been fully considered but are not found persuasive.

Applicants argue (page 12, section V),

“Chowdhury clearly does not relate to apparatus for a homogeneous gas-phase reaction, but to a wet oxidation reactor for oxidizing materials in liquid water. In addition, the problem addressed by Chowdhury is to prevent water evaporation, but ‘flow reversal’ by evaporation of water in said inlet pipes is not a concern for Kittleson. Thus, Kittleson and Chowdhury relate to completely different types of reactors, and one of ordinary skill would not have been motivated to combine the Chowdhury disclosure with that of Kittleson.”

The Examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Although the reactor of Kittleson relates to a homogeneous gas-phase reaction, Kittleson further discloses that,

*“It may be advantageous to preheat the oxygen in admixture with the hydrocarbon feed in a conventional preheater 12... In preheating the feed it is important to avoid temperatures which might be high enough to initiate the oxidation reaction before the gases enter the fluid bed. Thus, where a mixed hydrocarbon-oxygen gas is fed to the reactor, it is advisable to keep the preheat temperature of such a feed at least about 50 °C below the initiation temperature. Depending on the nature of the particular hydrocarbon feed employed, the preheat temperature may according be between about 150 and 250 °C.”* (column 6, line 63 to column 7, line 2).

This disclosure would have suggested to one having ordinary skill in the art that it is within the scope of the invention to introduce an admixture of hydrocarbon feed and oxygen (i.e., as an alternative to separate hydrocarbon feed and oxygen introduction) into the various points of the reactor of Kittleson, on the basis of suitability for the intended use (i.e., it is well known to conduct the feed introductions as such, to prevent the localized concentration of oxygen in the fluid bed). The disclosure would have further suggested that when introducing the reactants as an admixture, use of proper temperature control is important to prevent the undesired initiation of the oxidation reaction before the admixture enters the fluid bed.

Chowdhury teaches that the surround means (i.e., annular space **22** for inlet pipe **20**; FIG. 4) creates a thermal insulating barrier for the inlet pipe, thereby removing heat from the inlet

pipe to alleviate the phenomenon of flow reversal caused by evaporation of the flowing contents within the inlet pipe (i.e., which in the case of Chowdhury, comprises oxygen and purge water). The Examiner asserts that it would have been obvious for one having ordinary skill in the art at the time the invention was made to provide the surround means of Chowdhury to the inlet pipes of Kittleson, since the heat removing function of the surround means for the oxygen and purge water stream in Chowdhury would have likewise enabled heat removal and proper temperature control of the admixture of hydrocarbon feed and oxygen stream in Kittleson, to prevent the undesired initiation of the oxidation reaction before the admixture contacted the fluid bed.

### *Conclusion*

11. The following references were considered but not relied upon in the rejections above, as they were submitted in Applicants' IDS after the mailing date of the first Office Action, but prior to the mailing date of the instant Office Action:

Peters et al. (FIG. 1A) illustrate an inlet pipe (i.e., injection pipe 4) comprising surround means (i.e., jacket pipe 5), said inlet pipe for introducing a feed stream into a fluidized bed reactor 1. A grid, however, is not shown for the fluidized bed reactor.

Collin et al. (FIG. 1) illustrate an inlet pipe 4 comprising surround means jacket 7 with cooling channels 8), said inlet pipe for introducing a feed stream into a fluidized bed reactor (i.e., defined by wall 1). Collin et al. teaches that, "Since the gas containing the molecular oxygen is suitably pre-heated, this pipe may be surround by an annular duct, to which a cooling gas is supplied, by which means a too early decomposition of the carbonaceous material is avoided, and therewith deposits in the pipe are avoided." (column 2, lines 32-38). A grid, however, is not shown for the fluidized bed reactor.

Patel et al. (FIG. 1, 3) Illustrate a plurality of inlet pipes (i.e., transport pipes **52**) comprising surround means (i.e., water jackets **54**), said inlet pipes **52** for introducing a feed stream into a fluidized bed reactor (i.e., reactor **12**). The fluidized bed reactor **12** further comprises a grid element (i.e., gas distribution grid **24**). Patel et al. further teaches that, "The water jacket **54** substantially avoids premature heating due to conduction or radiation from the fluidized bed **16**." (column 4, lines 49-51). Such an arrangement would have anticipated Applicant's invention as recited in claim 1.

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a): A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

\* \* \*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Calderola can be reached on (571) 272-1444. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung  
February 20, 2004 *jal*

*Hien Tran*  
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PRIMARY EXAMINER